

CLAIMS

1. Blasting method, comprising using an array of onion-shaped drill holes having a cylindrical upper portion and an onion-like lowermost portion, which blasting method comprises:

- a) Drilling an array of cylindrical drill holes in a site that is to be blasted;
- b) For each of the cylindrical drill holes, performing the steps of:
 - b.1) Imparting an onion shape to the bottom portion of the drill hole;
 - b.2) Filling the onion with a primary explosive charge;
 - b.3) Filling a first portion of the drill hole, above said primary explosive charge, with buffer material;
 - b.4) Filling a second portion of the drill hole, above said buffer material, with a secondary explosive charge;
 - b.5) Filling a third portion of the drill hole with additional buffer material; and
- c) Detonating said primary and secondary explosive charges.

2. Method according to claim 1, wherein imparting the onion-like shape to the bottom portion of a drill hole is performed by:

- a) Filling the bottom portion of a cylindrical drill hole with initial explosive charge, which initial charge is relatively small with respect to the primary explosive charge, but is large enough to impart to the bottom of the drill hole the onion-like shape; and
- b) Detonating the initial explosive charge.

3. Method according to claim 2, wherein the bottom portion of the cylindrical drill hole, which is filled with the initial explosive charge, is preferably between 3% to 5% of the total depth of the cylindrical drill hole.
4. Method according to claim 2, wherein imparting the onion-like shape to the bottom portion of the drill hole further includes utilization of initial stemming for stemming the opening of the drill hole before detonating the initial explosive charge.
5. Method according to claims 3 or 4, wherein the initial stemming characteristics and/or the amount of initial explosive charge in the bottom portion of the cylindrical drill hole are utilized for obtaining wanted general shape and dimensions of the onion, according to known geological and topographical characteristics of the site to be blasted.
6. Method according to claim 1, wherein all of the drill holes are drilled to the same depth, which is between 80% to 90% of the "Bench Height".
7. Method according to claim 1, wherein the depth of the drill holes is approximately 13 meters, the diameter of the cylindrical portions is approximately 8 inches, and the lengths of the first, second and third portions of the drill hole are approximately 7.8m, 1.95m and 1.95m, respectively.
8. Method according to claim 5, wherein the length of the onion is preferably between 8% to 11% of the total depth of the drill hole, its maximum diameter is approximately

1.00 meter, and said onion is filled with a primary explosive charge, the weight of which ranges between 800 and 1,250 kilograms.

9. Method according to claim 1, wherein the array of drill holes comprises essentially parallel rows of drill holes; the spacing between each two adjacent drill holes in the same row being approximately 18 meters, and the spacing between each two adjacent rows being approximately 16 meters.

10. Method according to any of claims 1, 2 and 5, wherein the array of drill holes, depth of said drill holes, the dimensions and shape of the onions are determined according to the "Bench Height" in the site that is to be blasted.

11. Method according to any of claims 1, 2 and 5, wherein the onion-like lowermost portion is characterized by meeting the condition $0.5 < \eta < 0.9$.

12. Method according to claim 1, wherein the relative lengths of the first, second and third portions are approximately 60%, 15% and 15%, respectively, of the overall depth, or length, of the drill holes.